# CHBE 514 Macromolecular Engineering

Term: *Spring 2020* Instructor: *Amanda Marciel*

**Class schedule and location**

CHBE 514.001 (CRN: 24012): 9:25 to 10:40 am TR in MEL 254

**Office hours**

By appointment, or according to schedule provided on Canvas.

**Course description**

This course provides an in-depth understanding of the structure-property relationships of soft materials (primarily polymers) at the molecular and macromolecular level. Topics will include polymers synthesis, structure, transport and dynamics. In addition, this course will highlight the applications of complex fluids in energy, medicine and coatings/adhesives.

**Topics covered** (Topics may be added or altered based on class participation and performance)

1. Polymer Synthesis
2. Intermolecular forces, Brownian Motion, Random Walks, Gaussian Chains
3. Kuhn chain, Persistence length, Elasticity, Phase Transitions
4. Surface Forces and Thermodynamics of Interfaces
5. Macromolecular Thermodynamics
6. Transport Properties
7. Macromolecular Dynamics
8. Applications of Complex Fluids in Energy and Materials

**Course Objectives**

- Students will understand the physiochemical principles underlying macromolecular engineering needed for macroscopic optical, mechanical and transport properties of materials.

**Assignments/Exams**

- Students will be assessed via homework assignments, research papers and a final group project/presentation.

**Academic Integrity**

- Students are required to review and abide to the *Rice Honor Code*, which can be found at honor.rice.edu. After reading the Constitution of the Honor System, the *Honor Pledge* should be signed, dated and returned to your instructors.

**Disabled Students**

- Students with any type of disability –physical, learning, etc. – should seek assistance from the Disability Support Services in the Ley Student Center in order to obtain official documents and submit it to his or her instructor. Such situation will be dealt with on an individual basis.